

WHAT IS CLAIMED IS:

1. A radiation curable coating composition comprising a mixture of:

an oligomeric acrylate having a crosslinkable acrylate functionality of 1 to 6;

at least one of monomeric acrylates and dimeric acrylates, having a crosslinkable acrylate functionality of 1 to 6;

an acrylated colloidal silica; and

a photoinitiator.

2. A radiation curable coating composition in accordance with Claim 1 wherein said oligomeric acrylate comprises at least one of urethane modified acrylate oligomers, polyester modified acrylate oligomers, epoxy modified acrylate oligomers, and silicone modified acrylate oligomers.

3. A radiation curable coating composition in accordance with Claim 1 wherein said oligomeric acrylate comprises about 5 to about 50 parts by weight of said coating composition.

4. A radiation curable coating composition in accordance with Claim 3 wherein said oligomeric acrylate comprises about 25 to about 35 parts by weight of said coating composition.

5. A radiation curable coating composition in accordance with Claim 1 further comprising about 0.1 to about 10 parts by weight of a photoinitiator.

6. A radiation curable coating composition in accordance with Claim 1 wherein said photoinitiator comprises about 0.5 to about 5 parts by weight of said coating composition.

7. A radiation curable coating composition in accordance with Claim 1 wherein said acrylated colloidal silica comprises about 0.1 to about 75 parts by weight of said coating composition.

8. A radiation curable coating composition in accordance with Claim 7 wherein said acrylated colloidal silica comprises about 25 to about 60 parts by weight of said coating composition.

9. A radiation curable coating composition in accordance with Claim 1 further comprising about 0.1 to about 15 parts by weight of a UV stabilizer.

10. A radiation curable coating composition in accordance with Claim 9 wherein said UV stabilizer comprises about 1 to about 10 parts by weight of said coating composition.

11. A radiation curable coating composition in accordance with Claim 1 wherein said at least one of monomeric acrylates and dimeric acrylates comprises about 5 to about 80 parts by weight of said coating composition.

12. A radiation curable coating composition in accordance with Claim 11 wherein said at least one of monomeric acrylates and dimeric acrylates comprises about 10 to about 75 parts by weight of said coating composition.

13. A radiation curable coating composition in accordance with Claim 1 further comprising from about 0.1 to about 80 parts by weight of solvent.

14. A radiation curable coating composition comprising a mixture of:

about 5 to about 50 parts by weight of an oligomeric acrylate having a crosslinkable acrylate functionality of 1 to 6;

about 5 to about 80 parts by weight of at least one of monomeric acrylates and dimeric acrylates, having a crosslinkable acrylate functionality of 1 to 6;

about 0.1 to about 75 parts by weight of an acrylated colloidal silica; and

about 0.1 to about 10 parts by weight of a photoinitiator.

15. A radiation curable coating composition in accordance with Claim 14 wherein said oligomeric acrylate comprises about 25 to about 35 parts by weight of said coating composition.

16. A radiation curable coating composition in accordance with Claim 14 wherein said at least one of monomeric acrylates and dimeric acrylates comprises about 10 to about 75 parts by weight of said coating composition.

17. A radiation curable coating composition in accordance with Claim 14 wherein said photoinitiator comprises about 0.5 to about 5 parts by weight of said coating composition.

18. A radiation curable coating composition in accordance with Claim 14 wherein said oligomeric acrylate comprises at least one of urethane modified acrylate oligomers, polyester modified acrylate oligomers, epoxy modified acrylate oligomers, and silicone modified acrylate oligomers.

19. A radiation curable coating composition in accordance with Claim 14 further comprising about 0.1 to about 15 parts by weight of a UV stabilizer.

20. A radiation curable coating composition in accordance with Claim 19 wherein said UV stabilizer comprises about 1 to about 10 parts by weight of said coating composition.

21. A radiation curable coating composition in accordance with Claim 14 further comprising from about 0.1 to about 80 parts by weight of solvent.

22. A radiation curable coating composition in accordance with Claim 14 wherein said acrylated colloidal silica comprises about 25 to about 60 parts by weight of said coating composition.

23. A method of preparing a coated plastic substrate having abrasion resistance and low birefringence, said method comprising:

supplying a plastic substrate comprising a plastic sheet or a plastic film;

applying at least one layer of a radiation curable coating to at least one surface of the plastic substrate; and

exposing the at least one layer of the radiation curable coating to a radiation source for a sufficient time to cure the coating and form a protective layer of the substrate, said radiation curable coating comprising a mixture of:

about 5 to about 50 parts by weight of an oligomeric acrylate having a crosslinkable acrylate functionality of 1 to 6;

about 5 to about 80 parts by weight of at least one of monomeric acrylates and dimeric acrylates, having a crosslinkable acrylate functionality of 1 to 6;

about 0.1 to about 75 parts by weight of an acrylated colloidal silica; and

about 0.1 to about 10 parts by weight of a photoinitiator.

24. A method in accordance with Claim 23 wherein exposing the at least one layer of the radiation curable coating to a radiation source comprises exposing the at least one layer of the radiation curable coating to at least one of UV light and electron beam radiation.

25. A method with Claim 23 wherein the oligomeric acrylate comprises about 25 to about 35 parts by weight of the coating composition.

26. A method in accordance with Claim 23 wherein the at least one of monomeric acrylates and dimeric acrylates comprises about 10 to about 75 parts by weight of the coating composition.

27. A method in accordance with Claim 23 wherein the photoinitiator comprises about 0.5 to about 5 parts by weight of the coating composition.

28. A method in accordance with Claim 23 wherein the oligomeric acrylate comprises at least one of urethane modified acrylate oligomers, polyester modified acrylate oligomers, epoxy modified acrylate oligomers, and silicone modified acrylate oligomers.

29. A method in accordance with Claim 23 further comprising about 0.1 to about 15 parts by weight of a UV stabilizer.

30. A method in accordance with Claim 29 wherein the UV stabilizer comprises about 1 to about 10 parts by weight of said coating composition.

31. A method in accordance with Claim 23 further comprising from about 0.1 to about 80 parts by weight of solvent.

32. A method in accordance with Claim 23 wherein the acrylated colloidal silica comprises about 25 to about 60 parts by weight of the coating composition.